IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
Before the Board of Patent Appeals and Interferences

In re PATENT APPLICATION OF	Confirmation No. 2259
Christopher J. SKINNER	Group Art Unit: 1711
Application Serial No. 10/030,384	Examiner: R. Gorr
Filed: January 10, 2002	

Title: POLYISOCYANATE COMPOSITIONS FOR FAST CURE

December 29, 2003

* * * * *

BRIEF ON APPEAL UNDER 37 C.F.R. §1.192

Mail Stop Appeal Brief - Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

This is Appellants' Brief in support of the Appeal filed on October 27, 2003 in connection with the Final Rejection of all pending claims in the Official Action dated July 28, 2003.

I. INTRODUCTION

This Appeal is from an Office Action mailed July 28, 2003, finally rejecting claims 1-24 of the above-identified patent application.

A. Real Party in Interest

The real party in interest for this Appeal and the present application is Huntsman International LLC., by way of an Assignment recorded on January 10, 2002 in the U.S. Patent and Trademark Office at Reel 012759, Frame 0672.

B. Statement of Related Appeals and Interferences

There are presently no appeals or interferences known to Appellant, Appellant's representatives or the Assignee, which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

C. Status of Claims

Claims 1-24, are pending, stand rejected, and are on appeal. The claims on appeal are set forth in the attached Appendix. Claims 1, 20 and 24 are independent.

D. Status of Amendments

All claim amendments have been entered of record.

II. SUMMARY OF THE INVENTION

The present invention relates to polyisocyanate compositions for accelerating the binding of lignocellulosic materials such as oriented strand board or waferboard, medium density fiberboard and particle board. More particularly, the invention relates to polyisocyanate compositions comprising titanium complexes of titanium and acetoacetate esters of C_1-C_4 alcohols. (Page 1, lines 2-7).

As defined in present claim 1, the polyisocyanate compositions comprise a titanium complex comprising titanium and an acetoacetate ester of a C_1 to C_4 alcohol in a range of titanium to acetoacetate ester ratios of from 1:2 to 1:8. Such compositions enhance the cure rate of binders of lignocellulosic materials, (Page 1, lines 13-15), and are stable upon prolonged storage (Page 1, lines 16-18).

The present invention also provides a process of binding lignocellulosic material, comprising contacting a polyisocyanate composition as described above with a lignocellulosic material and allowing the material to bind, as in claim 20. This method may also involve hot pressing between metal plates at a temperature in the range of 140°C to 270°C and a pressure in the range of 2 to 6 MPa, as in claim 21, and a weight of

polyisocyanate composition to lignocellulosic material in the range of from 0.1 : 99.9 to 20:80, as in claim 22. A process for accelerating the binding of lignocellulosic materials with the compositions of the present invention is also provided, as in claim 24. The increased efficiency afforded by the compositions of the present invention in lignocellulosic binding allows for such binding to be performed at lower operating temperatures and thus provides a process with lower energy consumption and savings. (Page 8, lines 17-19).

The titanium complexes of the present invention may be prepared from a variety of titanium containing species. For example, from titanium alkoxides of the formula $Ti(OR)_4$, where R is a substituted or unsubstituted, cyclic or linear, alkyl or alkenyl group, as in claim 5, or where R contains six carbon atoms, as in claim 6, or four carbon atoms, as in claim 7. (Page 2, lines 19-22). The titanium complexes useful in the compositions and methods of the present invention may also be prepared from condensed titanium alkoxides, such as those of the formula $RO[Ti(OR_2)O]_xR$, where x is an integer and R is a substituted or unsubstituted, cyclic or linear, alkyl or alkenyl group, as in claim 8, or where x is an integer in the range of 2 to 16, as in claim 9. (Page 3, Lines 6-9). The desired acetoacetate ester may be added, for example, to the starting titanium alkoxide, while removing the displaced alcohol. (Page 3, lines 17-20).

III. ISSUE

Whether the Examiner erred in finally rejecting claims 1-24, under 35 U.S.C. § 102(b) over Jung *et al.*

IV. GROUPING OF CLAIMS

Each claim of this application is separately patentable and upon issuance of a patent will be entitled to a separate presumption of validity under 35 U.S.C. § 282. The claims do not stand or fall together.

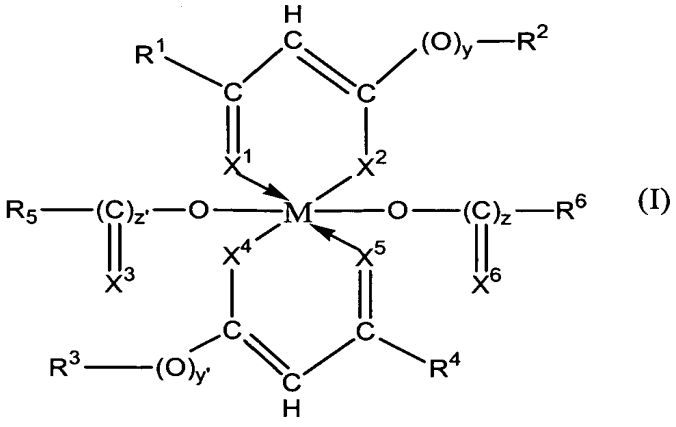
Arguments supporting the separate patentability of each claim are presented in the "Argument" section of this brief as required by 37 C.F.R. §1.192(c)(7).

V. ARGUMENT

A. Jung Does Not Anticipate the Claimed Invention

The present invention is directed to polyisocyanate compositions comprising a titanium complex comprising titanium and an acetoacetate ***ester*** of a C_1 *to* C_4 alcohol, which accelerate the binding of lignocellulosic material, and have a Ti:acetoacetate ester ratio of from 1:2 to 1:8. The present invention also describes a method of using these complexes to accelerate the binding of lignocellulosic materials. The Examiner has rejected all of the pending claims under 35 U.S.C. §102(b) as anticipated by Jung *et al.*

Jung describes the following structure (I), which literally encompasses the titanium acetoacetate ester complexes described in the present invention:



(I)

with variables broadly defined as follows:

> wherein X^1, X^2, X^3, X^4, X^5, and X^6 (same or different) represent O or S or N, z and z' (same or different) are 0 or 1, y and y' (same or different) are 0 or 1, R^1 and R^4 (same or different) represent an aliphatic hydrocarbon radical having 1 to 30 carbon atoms, R^2 and R^3 (same or different) represent an aliphatic hydrocarbon radical having 1 to 30 carbon atoms, R^5 and R^6 (same or different) represent an aliphatic hydrocarbon radical having 1 to 30 carbon atoms and M represents Ti or Zr or Hf.[1]

However, Jung never explicitly calls out a polyisocyanate composition comprising titanium complexes of titanium and acetoacetate ***esters*** of a C_1 to C_4 alcohol.

Despite never exemplifying, preferring, or otherwise reporting a single titanium complex of an acetoacetate ***ester*** of a C_1 to C_4 alcohol, the Examiner nonetheless contends that Jung's general disclosure anticipates the claimed class of compositions. The Applicant asserts that Jung fails to "sufficiently describe the claimed invention to have placed the public in possession of it"[2] and, consequently, that the Examiner has committed reversible error by maintaining this rejection.

Accordingly, the issue in this case asks: whether the broad genus described in Formula (I) of Jung anticipates this narrower, uncharacterized and non-exemplified, class of acetoacetate ***esters*** of C_1 to C_4 alcohols. For a broad disclosure of a genus to anticipate a later claim to a species, the asserted genus must be described in such a way as to allow the skilled artisan to "at once envisage each member" of this class.[3] The *Petering* court looked to the examples and preferences of the asserted reference to formulate a narrower class of compounds that could be at once envisaged from the broader disclosure.

Turning to the facts of this case, we see that the skilled artisan, after studying the disclosure of Jung, would at once envisage compounds that are distinctly different from the titanium complexes of acetoacetate ***esters*** of C_1 to C_4 alcohols of the present invention. Indeed, the only examples which illustrate the use on an acetoacetate ester at

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1 Jung at page 3, lines 7-12.

2 *Minnesota Mining and Manufacturing Co. v. Johnson & Johnson Orthopaedics Inc.*, 976 F.2d 1559, 24 USPQ2d 1321, 1332 (Fed. Cir. 1992).

all only report mixing cetylacetoacetate with titanium bis***acetylacetonate*** to obtain diisoproproxy titanium bis(cetylacetoacetate). Cetylacetoacetate is an acetoacetate ester of cetyl alcohol, which is a C_{16} alcohol. Therefore, nowhere does Jung provide an anticipatory disclosure of an acetoacetate ***ester*** of a *C_1 to C_4* alcohol.

In fact, the very passage cited by the Examiner as anticipatory disclosure does not even describe ***esters*** at all, but instead teaches only ***acetylacetonate*** complexes by declaring a preference for compounds wherein "y and y' are both 0 and R^1, R^2, R^3 and R^4 contain from 1 to 3 carbon atoms."[4] Thus, while Jung may describe C_1 to C_4 groups attached to ***acetylacetonate*** ligands, this reference does not, contrary to Examiner's assertion, "[prefer] acetoacetate esters made from C1-C3 alcohols".[5]

Having found the definition of "R1-R4" at one corner of Jung, the Examiner argues that the present invention is anticipated by compounds generated from the mechanical combination of these R groups with general disclosure of y definitions – while ignoring the rest of the Jung disclosure which repeatedly references ***acetylacetonate*** ligands, but says nothing about acetoacetate ***esters*** of *C_1 to C_4* alcohols. Indeed, Jung explicitly states that preferred compounds are those where y and y' are 0, that is, acetylacetonates.[6]

Therefore, reviewing the specification in light of compounds which were exemplified and preferred, reveals that the skilled artisan would at once envisage a class of titanium complexes that include titanium acetylacetonate complexes. Giving the full benefit of doubt to the Examiner would allow the skilled artisan to envisage titanium complexes comprising cetyl acetoacetate esters, which is an acetoacetate ester of a C_{16} alcohol, and perhaps even envisage a class of compounds of long carbon chain esters of acetoacetate esters.

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3 *In re Petering and Fall*, 301 F.2d 676, 682, 133 USPQ 275, 280 (CCPA, 1962); *See also*: *Bristol-Myers Squibb Co. v. Ben Venue Laboratories, Inc.*, 246 F.3d 1368, 58 USPQ2d 1508, 1517 (Fed Cir. 2001).

4 In order to generate an acetoacetate ***ester***, at least one of y or y' in Formula (I) must be 1.

5 Office action mailed April 4, 2003 (Paper No. 9) at page 2.

6 *e.g.*, Jung, page 3, lines 20-21.

Jung, however, provides no disclosure that would allow the skilled artisan to envisage an acetoacetate ***ester*** of a C_1 *to* C_4 alcohol. Accordingly the general disclosure relied on by the Examiner fails to anticipate the present invention.

Similarly, as Jung prefers acetoacetonate ligands and only, at best, exemplifies long carbon chain acetoacetate esters, the skilled artisan would have no motivation to modify the Jung to obtain the present invention, or any reasonable expectation of successfully achieving the present invention, upon modification of Jung. Accordingly, although not raised by the Examiner below, Jung would not render the presently claimed invention obvious under 35 U.S.C. §103.

B. Each Claim is Separately Patentable

Each of claims 2 and 3 is separately patentable over Jung in that each of these claims further defines the Ti to acetoacetate ester ratio. Jung fails to anticipate a polyisocyanate composition comprising a titanium complex comprising titanium and an acetoacetate ***ester*** of a C_1 *to* C_4 alcohol, it fails to anticipate the further claimed ratio ranges of titanium to these esters as presented in claim 2 or 3. Thus, each of these claims is separately patentable over Jung.

Likewise, claim 4 is separately patentable over Jung because Jung fails to anticipate a titanium complex comprising titanium and ethyl acetoacetate.

Each of claims 5-10, which further limit the starting material or synthetic routes from which the claimed titanium complex is formed, is also separately patentable over Jung. For example, Jung does not anticipate the titanium complex of an acetoacetate ***ester*** of a C_1 *to* C_4 alcohol prepared from the $M(OR)_4$ starting material of claim 5, or where R contains up to 6 carbon atoms as in claim 6, or up to 4 carbon atoms as in claim 7. Nor does Jung describe preparing titanium complexes comprising an acetoacetate ***ester*** of a C_1 *to* C_4 alcohol from the condensed titanium alkoxide $RO[M(OR_2)O]_xR$ of claim 8, let alone the condensed titanium alkoxide wherein x is in the range of 2 to 16 as in claim 9. Similarly, Jung does not anticipate a titanium complex comprising an acetoacetate

ester of a C_1 to C_4 alcohol prepared from a titanium alkoxide or condensed alkoxide by removing the displaced alcohol, as in claim 10.

Similarly, Jung fails to disclose the quantity of titanium complex comprising an acetoacetate ***ester*** of a C_1 to C_4 alcohol present in the polyisocyanate composition, as in claims 12 and 13, or that the polyisocyanate further comprises a diluent such as phthalate, an aliphatic carboxylate, a fatty acid ester, linseed oil, or soybean oil, as in claims 14 or 15, or that such a diluent is present in the amount of 1 to 40 parts by weight, as in claim 16. Thus, each of these claims is separately patentable over Jung.

Nor does Jung discuss adding a formaldehyde condensate adhesive resin to polyisocyanate compositions comprising a titanium complex comprising an acetoacetate ***ester*** of a C_1 to C_4 alcohol as in claim 17, or the amounts of such resins as in claims 18 or 19. Accordingly, each of these claims is separately patentable over Jung.

Jung also does not discuss a process for binding a lingocellulosic material by contacting a lingocellulosic material with a polyisocyanate composition comprising a titanium complex comprising titanium and an acetoacetate ***ester*** of a C_1 to C_4 alcohol, as claimed in claim 20, let along where such a process includes hot pressing at 140°C to 270°C and at a pressure in the range of 2 to 6 MPa as in claim 21, or where with the specified ratio of polyisocyanate to lignocellulosic material of claim 22. Accordingly, each of these claims is separately patentable over Jung.

Finally, Jung does not discuss the use of a titanium complex comprising titanium and an acetoacetate ***ester*** of a C_1 to C_4 alcohol to accelerate the binding of lignocellulosic materials, or a process for accelerating the binding of lignocellulosic material using these complexes as defined in claim 24. Accordingly, each of these claims is separately patentable over Jung.

VI. CONCLUSION

For at least the reasons discussed above, it is respectfully submitted that claims 1-24 are novel over Jung.

For the above reasons, Appellants respectfully requests this Honorable Board of Patent Appeals and Interferences to reverse the final rejection of the claims.

Respectfully submitted,

PILLSBURY WINTHROP LLP

By: _____

Christopher M. Beck
Registration No. 52,603
Direct No. (703) 905-2013

Paul L. Sharer
Registration No. 36,004
Direct No. (703) 905-2180

1600 Tysons Boulevard
McLean, Virginia 22102
(703) 905-2000 Telephone
(703) 905-2500 Facsimile

Attorney Reference: 038266/0290579
Attachment: Appendix with pending claims

VII. APPENDIX

A. Claims 1-24 are pending as follows:

1. A polyisocyanate composition comprising a titanium complex comprising titanium and an acetoacetate ester in which the molar ratio of Ti to acetoacetate ester is in the range 1:2 to 1:8 and said acetoacetate ester is an ester of an alcohol containing 1 to 4 carbon atoms.

2. A polyisocyanate composition according to claim 1 in which the complex is a complex of titanium having a molar ratio of Ti to acetoacetate ester in the range 1: 2 to 1: 6.

3. A polyisocyanate composition according to claim 2 in which the molar ratio of Ti to acetoacetate ester is in the range 1: 2.5 to 1: 5.

4. A polyisocyanate composition according to claim 1 in which the acetoacetate ester is ethyl acetoacetate.

5. A polyisocyanate composition according to claim 1 in which the complex has been prepared from a titanium alkoxide having the general formula $M(OR)_4$ in which M is Ti and R is substituted or unsubstituted, cyclic or linear, alkyl, alkenyl group.

6. A polyisocyanate composition according to claim 5 in which R contains up to 6 carbon atoms.

7. A polyisocyanate composition according to claim 6 in which R contains up to 4 carbon atoms.

8. A polyisocyanate composition according to claim 1 in which the complex has been prepared from a condensed titanium alkoxide having the general formula $RO[M(OR)_2O]_xR$ in which M is Ti and x is an integer and R is substituted or unsubstituted, cyclic or linear, alkyl, alkenyl group.

9. A polyisocyanate composition according to claim 8 in which the average value of x is in the range 2 to 16.

10. A polyisocyanate composition according claim 1 in which the complex is prepared from an alkoxide and displaced alcohol is removed.

11. A polyisocyanate composition according to claim 1 in which the complex is present in an amount in the range 0.03 to 1% by weight based on the polyisocyanate.

12. A polyisocyanate composition according to claim 11 in which the amount of complex is in the range 0.05 to 0.5 % by weight based on the polyisocyanate.

13. A polyisocyanate composition according to claim 1 in which the polyisocyanate is diphenylmethane diisocyanate or a mixture of methylene bridged polyphenyl polyisocyanates.

14. A polyisocyanate composition according to claim 1 additionally comprising a diluent.

15. A polyisocyanate composition according to claim 14 in which the diluent is a phthalate, an aliphatic carboxylate, a fatty acid ester, linseed oil or soybean oil.

16. A polyisocyanate composition according to claim 15 in which the diluent is present in an amount in the range 1 to 40 parts by weight per 100 parts by weight of polyisocyanate.

17. A polyisocyanate composition according to claim 1 additionally comprising a formaldehyde condensate adhesive resin.

18. A polyisocyanate composition according to claim 17 in which the formaldehyde condensate adhesive resin is present in an amount in the range 1 to 40 parts by weight per 100 parts by weight of polyisocyanate.

19. A polyisocyanate composition according to claim 18 in which the formaldehyde condensate adhesive resin is present in an amount in the range 1 to 20 parts by weight per 100 parts by weight of polyisocyanate.

20. A process for binding lignocellulosic material comprising the steps of a) bringing lignocellulosic material into contact with a polyisocyanate composition according to any one of the preceding claims and b) subsequently allowing said material to bind.

21. A process according to claim 20 in which the polyisocyanate composition is brought into contact with the lignocellulosic material and the combination thereby formed is hot-pressed between metal plates at a temperature in the range 140° C to 270° C and a specific pressure in the range 2 to 6 MPa.

22. A process according to claim 20 in which the polyisocyanate composition is applied in such an amount as to give a weight ratio of polyisocyanate to lignocellulosic material in the range 0.1:99.9 to 20:80.

23. A method comprising using a Titanium complex as defined in claim 1 for accelerating the binding of lignocellulosic materials.

24. A process for accelerating the binding of lignocellulosic material comprising

a) contacting lignocellulosic material with a titanium complex comprising titanium and an acetoacetate ester in which the molar ratio of Ti to acetoacetate ester is in the range 1:2 to 1:8 and said acetoacetate ester is an ester of an alcohol containing 1 to 4 carbon atoms; and

b) subsequently allowing said material to bind.

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* * * * *

BRIEF ON APPEAL UNDER 37 C.F.R. §1.192

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I. INTRODUCTION

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C. Status of Claims

Claims 1-24, are pending, stand rejected, and are on appeal. The claims on appeal are set forth in the attached Appendix. Claims 1, 20 and 24 are independent.

D. Status of Amendments

All claim amendments have been entered of record.

II. SUMMARY OF THE INVENTION

The present invention relates to polyisocyanate compositions for accelerating the binding of lignocellulosic materials such as oriented strand board or waferboard, medium density fiberboard and particle board. More particularly, the invention relates to polyisocyanate compositions comprising titanium complexes of titanium and acetoacetate esters of C_1-C_4 alcohols. (Page 1, lines 2-7).

As defined in present claim 1, the polyisocyanate compositions comprise a titanium complex comprising titanium and an acetoacetate ester of a C_1 to C_4 alcohol in a range of titanium to acetoacetate ester ratios of from 1:2 to 1:8. Such compositions enhance the cure rate of binders of lignocellulosic materials, (Page 1, lines 13-15), and are stable upon prolonged storage (Page 1, lines 16-18).

The present invention also provides a process of binding lignocellulosic material, comprising contacting a polyisocyanate composition as described above with a lignocellulosic material and allowing the material to bind, as in claim 20. This method may also involve hot pressing between metal plates at a temperature in the range of 140°C to 270°C and a pressure in the range of 2 to 6 MPa, as in claim 21, and a weight of

polyisocyanate composition to lignocellulosic material in the range of from 0.1 : 99.9 to 20:80, as in claim 22. A process for accelerating the binding of lignocellulosic materials with the compositions of the present invention is also provided, as in claim 24. The increased efficiency afforded by the compositions of the present invention in lignocellulosic binding allows for such binding to be performed at lower operating temperatures and thus provides a process with lower energy consumption and savings. (Page 8, lines 17-19).

The titanium complexes of the present invention may be prepared from a variety of titanium containing species. For example, from titanium alkoxides of the formula $Ti(OR)_4$, where R is a substituted or unsubstituted, cyclic or linear, alkyl or alkenyl group, as in claim 5, or where R contains six carbon atoms, as in claim 6, or four carbon atoms, as in claim 7. (Page 2, lines 19-22). The titanium complexes useful in the compositions and methods of the present invention may also be prepared from condensed titanium alkoxides, such as those of the formula $RO[Ti(OR_2)O]_xR$, where x is an integer and R is a substituted or unsubstituted, cyclic or linear, alkyl or alkenyl group, as in claim 8, or where x is an integer in the range of 2 to 16, as in claim 9. (Page 3, Lines 6-9). The desired acetoacetate ester may be added, for example, to the starting titanium alkoxide, while removing the displaced alcohol. (Page 3, lines 17-20).

III. ISSUE

Whether the Examiner erred in finally rejecting claims 1-24, under 35 U.S.C. § 102(b) over Jung *et al.*

IV. GROUPING OF CLAIMS

Each claim of this application is separately patentable and upon issuance of a patent will be entitled to a separate presumption of validity under 35 U.S.C. § 282. The claims do not stand or fall together.

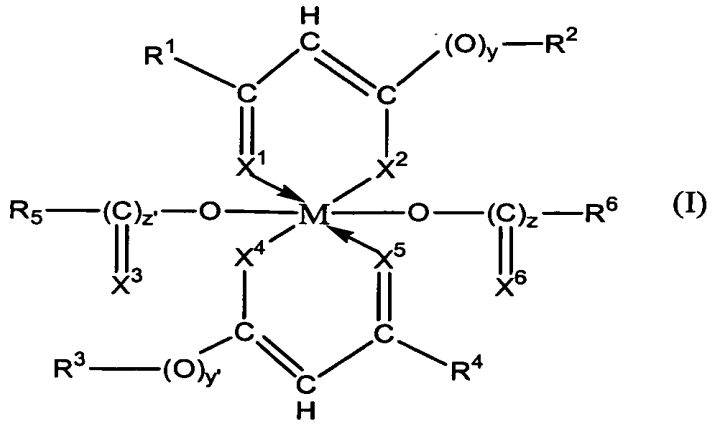
Arguments supporting the separate patentability of each claim are presented in the "Argument" section of this brief as required by 37 C.F.R. §1.192(c)(7).

V. ARGUMENT

A. Jung Does Not Anticipate the Claimed Invention

The present invention is directed to polyisocyanate compositions comprising a titanium complex comprising titanium and an acetoacetate ***ester*** of a C_1 *to* C_4 alcohol, which accelerate the binding of lignocellulosic material, and have a Ti:acetoacetate ester ratio of from 1:2 to 1:8. The present invention also describes a method of using these complexes to accelerate the binding of lignocellulosic materials. The Examiner has rejected all of the pending claims under 35 U.S.C. §102(b) as anticipated by Jung *et al.*

Jung describes the following structure (I), which literally encompasses the titanium acetoacetate ester complexes described in the present invention:



(I)

with variables broadly defined as follows:

> wherein X^1, X^2, X^3, X^4, X^5, and X^6 (same or different) represent O or S or N, z and z' (same or different) are 0 or 1, y and y' (same or different) are 0 or 1, R^1 and R^4 (same or different) represent an aliphatic hydrocarbon radical having 1 to 30 carbon atoms, R^2 and R^3 (same or different) represent an aliphatic hydrocarbon radical having 1 to 30 carbon atoms, R^5 and R^6 (same or different) represent an aliphatic hydrocarbon radical having 1 to 30 carbon atoms and M represents Ti or Zr or Hf.[1]

However, Jung never explicitly calls out a polyisocyanate composition comprising titanium complexes of titanium and acetoacetate ***esters*** of a C_1 to C_4 alcohol.

Despite never exemplifying, preferring, or otherwise reporting a single titanium complex of an acetoacetate ***ester*** of a C_1 to C_4 alcohol, the Examiner nonetheless contends that Jung's general disclosure anticipates the claimed class of compositions. The Applicant asserts that Jung fails to "sufficiently describe the claimed invention to have placed the public in possession of it"[2] and, consequently, that the Examiner has committed reversible error by maintaining this rejection.

Accordingly, the issue in this case asks: whether the broad genus described in Formula (I) of Jung anticipates this narrower, uncharacterized and non-exemplified, class of acetoacetate ***esters*** of C_1 to C_4 alcohols. For a broad disclosure of a genus to anticipate a later claim to a species, the asserted genus must be described in such a way as to allow the skilled artisan to "at once envisage each member" of this class.[3] The *Petering* court looked to the examples and preferences of the asserted reference to formulate a narrower class of compounds that could be at once envisaged from the broader disclosure.

Turning to the facts of this case, we see that the skilled artisan, after studying the disclosure of Jung, would at once envisage compounds that are distinctly different from the titanium complexes of acetoacetate ***esters*** of C_1 to C_4 alcohols of the present invention. Indeed, the only examples which illustrate the use on an acetoacetate ester at

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1 Jung at page 3, lines 7-12.

2 *Minnesota Mining and Manufacturing Co. v. Johnson & Johnson Orthopaedics Inc.*, 976 F.2d 1559, 24 USPQ2d 1321, 1332 (Fed. Cir. 1992).

all only report mixing cetylacetoacetate with titanium bis***acetylacetonate*** to obtain diisoproproxy titanium bis(cetylacetoacetate). Cetylacetoacetate is an acetoacetate ester of cetyl alcohol, which is a C_{16} alcohol. Therefore, nowhere does Jung provide an anticipatory disclosure of an acetoacetate ***ester*** of a C_1 *to* C_4 alcohol.

In fact, the very passage cited by the Examiner as anticipatory disclosure does not even describe ***esters*** at all, but instead teaches only ***acetylacetonate*** complexes by declaring a preference for compounds wherein "y and y' are both 0 and R^1, R^2, R^3 and R^4 contain from 1 to 3 carbon atoms."[4] Thus, while Jung may describe C_1 to C_4 groups attached to ***acetylacetonate*** ligands, this reference does not, contrary to Examiner's assertion, "[prefer] acetoacetate esters made from C1-C3 alcohols".[5]

Having found the definition of "R1-R4" at one corner of Jung, the Examiner argues that the present invention is anticipated by compounds generated from the mechanical combination of these R groups with general disclosure of y definitions – while ignoring the rest of the Jung disclosure which repeatedly references ***acetylacetonate*** ligands, but says nothing about acetoacetate ***esters*** of C_1 *to* C_4 alcohols. Indeed, Jung explicitly states that preferred compounds are those where y and y' are 0, that is, acetylacetonates.[6]

Therefore, reviewing the specification in light of compounds which were exemplified and preferred, reveals that the skilled artisan would at once envisage a class of titanium complexes that include titanium acetylacetonate complexes. Giving the full benefit of doubt to the Examiner would allow the skilled artisan to envisage titanium complexes comprising cetyl acetoacetate esters, which is an acetoacetate ester of a C_{16} alcohol, and perhaps even envisage a class of compounds of long carbon chain esters of acetoacetate esters.

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3 *In re Petering and Fall*, 301 F.2d 676, 682, 133 USPQ 275, 280 (CCPA, 1962); *See also*: *Bristol-Myers Squibb Co. v. Ben Venue Laboratories, Inc.*, 246 F.3d 1368, 58 USPQ2d 1508, 1517 (Fed Cir. 2001).

4 In order to generate an acetoacetate ***ester***, at least one of y or y' in Formula (I) must be 1.

5 Office action mailed April 4, 2003 (Paper No. 9) at page 2.

6 *e.g.*, Jung, page 3, lines 20-21.

Jung, however, provides no disclosure that would allow the skilled artisan to envisage an acetoacetate ***ester*** of a C_1 to C_4 alcohol. Accordingly the general disclosure relied on by the Examiner fails to anticipate the present invention.

Similarly, as Jung prefers acetoacetonate ligands and only, at best, exemplifies long carbon chain acetoacetate esters, the skilled artisan would have no motivation to modify the Jung to obtain the present invention, or any reasonable expectation of successfully achieving the present invention, upon modification of Jung. Accordingly, although not raised by the Examiner below, Jung would not render the presently claimed invention obvious under 35 U.S.C. §103.

B. Each Claim is Separately Patentable

Each of claims 2 and 3 is separately patentable over Jung in that each of these claims further defines the Ti to acetoacetate ester ratio. Jung fails to anticipate a polyisocyanate composition comprising a titanium complex comprising titanium and an acetoacetate ***ester*** of a C_1 to C_4 alcohol, it fails to anticipate the further claimed ratio ranges of titanium to these esters as presented in claim 2 or 3. Thus, each of these claims is separately patentable over Jung.

Likewise, claim 4 is separately patentable over Jung because Jung fails to anticipate a titanium complex comprising titanium and ethyl acetoacetate.

Each of claims 5-10, which further limit the starting material or synthetic routes from which the claimed titanium complex is formed, is also separately patentable over Jung. For example, Jung does not anticipate the titanium complex of an acetoacetate ***ester*** of a C_1 to C_4 alcohol prepared from the $M(OR)_4$ starting material of claim 5, or where R contains up to 6 carbon atoms as in claim 6, or up to 4 carbon atoms as in claim 7. Nor does Jung describe preparing titanium complexes comprising an acetoacetate ***ester*** of a C_1 to C_4 alcohol from the condensed titanium alkoxide $RO[M(OR_2)O]_xR$ of claim 8, let alone the condensed titanium alkoxide wherein x is in the range of 2 to 16 as in claim 9. Similarly, Jung does not anticipate a titanium complex comprising an acetoacetate

ester of a C_1 to C_4 alcohol prepared from a titanium alkoxide or condensed alkoxide by removing the displaced alcohol, as in claim 10.

Similarly, Jung fails to disclose the quantity of titanium complex comprising an acetoacetate ***ester*** of a C_1 to C_4 alcohol present in the polyisocyanate composition, as in claims 12 and 13, or that the polyisocyanate further comprises a diluent such as phthalate, an aliphatic carboxylate, a fatty acid ester, linseed oil, or soybean oil, as in claims 14 or 15, or that such a diluent is present in the amount of 1 to 40 parts by weight, as in claim 16. Thus, each of these claims is separately patentable over Jung.

Nor does Jung discuss adding a formaldehyde condensate adhesive resin to polyisocyanate compositions comprising a titanium complex comprising an acetoacetate ***ester*** of a C_1 to C_4 alcohol as in claim 17, or the amounts of such resins as in claims 18 or 19. Accordingly, each of these claims is separately patentable over Jung.

Jung also does not discuss a process for binding a lingocellulosic material by contacting a lingocellulosic material with a polyisocyanate composition comprising a titanium complex comprising titanium and an acetoacetate ***ester*** of a C_1 to C_4 alcohol, as claimed in claim 20, let along where such a process includes hot pressing at 140°C to 270°C and at a pressure in the range of 2 to 6 MPa as in claim 21, or where with the specified ratio of polyisocyanate to lignocellulosic material of claim 22. Accordingly, each of these claims is separately patentable over Jung.

Finally, Jung does not discuss the use of a titanium complex comprising titanium and an acetoacetate ***ester*** of a C_1 to C_4 alcohol to accelerate the binding of lignocellulosic materials, or a process for accelerating the binding of lignocellulosic material using these complexes as defined in claim 24. Accordingly, each of these claims is separately patentable over Jung.

VI. CONCLUSION

For at least the reasons discussed above, it is respectfully submitted that claims 1-24 are novel over Jung.

For the above reasons, Appellants respectfully requests this Honorable Board of Patent Appeals and Interferences to reverse the final rejection of the claims.

Respectfully submitted,

PILLSBURY WINTHROP LLP

By: _____

Christopher M. Beck
Registration No. 52,603
Direct No. (703) 905-2013

Paul L. Sharer
Registration No. 36,004
Direct No. (703) 905-2180

1600 Tysons Boulevard
McLean, Virginia 22102
(703) 905-2000 Telephone
(703) 905-2500 Facsimile

Attorney Reference: 038266/0290579
Attachment: Appendix with pending claims

VII. APPENDIX

A. Claims 1-24 are pending as follows:

1. A polyisocyanate composition comprising a titanium complex comprising titanium and an acetoacetate ester in which the molar ratio of Ti to acetoacetate ester is in the range 1:2 to 1:8 and said acetoacetate ester is an ester of an alcohol containing 1 to 4 carbon atoms.

2. A polyisocyanate composition according to claim 1 in which the complex is a complex of titanium having a molar ratio of Ti to acetoacetate ester in the range 1: 2 to 1: 6.

3. A polyisocyanate composition according to claim 2 in which the molar ratio of Ti to acetoacetate ester is in the range 1: 2.5 to 1: 5.

4. A polyisocyanate composition according to claim 1 in which the acetoacetate ester is ethyl acetoacetate.

5. A polyisocyanate composition according to claim 1 in which the complex has been prepared from a titanium alkoxide having the general formula $M(OR)_4$ in which M is Ti and R is substituted or unsubstituted, cyclic or linear, alkyl, alkenyl group.

6. A polyisocyanate composition according to claim 5 in which R contains up to 6 carbon atoms.

7. A polyisocyanate composition according to claim 6 in which R contains up to 4 carbon atoms.

8. A polyisocyanate composition according to claim 1 in which the complex has been prepared from a condensed titanium alkoxide having the general formula $RO[M(OR)_2O]_xR$ in which M is Ti and x is an integer and R is substituted or unsubstituted, cyclic or linear, alkyl, alkenyl group.

9. A polyisocyanate composition according to claim 8 in which the average value of x is in the range 2 to 16.

10. A polyisocyanate composition according claim 1 in which the complex is prepared from an alkoxide and displaced alcohol is removed.

11. A polyisocyanate composition according to claim 1 in which the complex is present in an amount in the range 0.03 to 1% by weight based on the polyisocyanate.

12. A polyisocyanate composition according to claim 11 in which the amount of complex is in the range 0.05 to 0.5 % by weight based on the polyisocyanate.

13. A polyisocyanate composition according to claim 1 in which the polyisocyanate is diphenylmethane diisocyanate or a mixture of methylene bridged polyphenyl polyisocyanates.

14. A polyisocyanate composition according to claim 1 additionally comprising a diluent.

15. A polyisocyanate composition according to claim 14 in which the diluent is a phthalate, an aliphatic carboxylate, a fatty acid ester, linseed oil or soybean oil.

16. A polyisocyanate composition according to claim 15 in which the diluent is present in an amount in the range 1 to 40 parts by weight per 100 parts by weight of polyisocyanate.

17. A polyisocyanate composition according to claim 1 additionally comprising a formaldehyde condensate adhesive resin.

18. A polyisocyanate composition according to claim 17 in which the formaldehyde condensate adhesive resin is present in an amount in the range 1 to 40 parts by weight per 100 parts by weight of polyisocyanate.

19. A polyisocyanate composition according to claim 18 in which the formaldehyde condensate adhesive resin is present in an amount in the range 1 to 20 parts by weight per 100 parts by weight of polyisocyanate.

20. A process for binding lignocellulosic material comprising the steps of a) bringing lignocellulosic material into contact with a polyisocyanate composition according to any one of the preceding claims and b) subsequently allowing said material to bind.

21. A process according to claim 20 in which the polyisocyanate composition is brought into contact with the lignocellulosic material and the combination thereby formed is hot-pressed between metal plates at a temperature in the range 140° C to 270° C and a specific pressure in the range 2 to 6 MPa.

22. A process according to claim 20 in which the polyisocyanate composition is applied in such an amount as to give a weight ratio of polyisocyanate to lignocellulosic material in the range 0.1:99.9 to 20:80.

23. A method comprising using a Titanium complex as defined in claim 1 for accelerating the binding of lignocellulosic materials.

24. A process for accelerating the binding of lignocellulosic material comprising

a) contacting lignocellulosic material with a titanium complex comprising titanium and an acetoacetate ester in which the molar ratio of Ti to acetoacetate ester is in the range 1:2 to 1:8 and said acetoacetate ester is an ester of an alcohol containing 1 to 4 carbon atoms; and

b) subsequently allowing said material to bind.

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PTO/SB/17 (10-03)
Approved for use through 07/31/2006. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

FEE TRANSMITTAL for FY 2004

Effective 10/01/2003. Patent fees are subject to annual revision.

☐ Applicant claims small entity status. See 37 CFR 1.27

TOTAL AMOUNT OF PAYMENT ($) 330.00

Complete if Known	
Application Number	10/030,384
Filing Date	January 10, 2002
First Named Inventor	CHRISTOPHER JOHN SKINNER
Examiner Name	R. Gorr
Art Unit	1711
Attorney Docket No.	038266-0290579

METHOD OF PAYMENT *(check all that apply)*

☐ Check ☐ Credit card ☐ Money Order ☐ Other ☐ None

☒ Deposit Account:

Deposit Account Number: 033975

Deposit Account Name: PILLSBURY WINTHROP LLP

The Director is authorized to: *(check all that apply)*

☒ Charge fee(s) indicated below ☒ Credit any overpayments

☒ Charge any additional fee(s) or any underpayment of fee(s)

☐ Charge fee(s) indicated below, **except for the filing fee** to the above-identified deposit account.

FEE CALCULATION

1. BASIC FILING FEE

Large Entity Fee Code	Large Entity Fee ($)	Small Entity Fee Code	Small Entity Fee ($)	Fee Description	Fee Paid
1001	770	2001	385	Utility filing fee	
1002	340	2002	170	Design filing fee	
1003	530	2003	265	Plant filing fee	
1004	770	2004	385	Reissue filing fee	
1005	160	2005	80	Provisional filing fee	

SUBTOTAL (1) ($) 0.00

2. EXTRA CLAIM FEES FOR UTILITY AND REISSUE

		Extra Claims		Fee from below		Fee Paid
Total Claims	24	-20** = 0	X		=	0
Independent Claims	3	- 3** = 0	X		=	0
Multiple Dependent					=	

Large Entity Fee Code	Large Entity Fee ($)	Small Entity Fee Code	Small Entity Fee ($)	Fee Description
1202	18	2202	9	Claims in excess of 20
1201	86	2201	43	Independent claims in excess of 3
1203	290	2203	145	Multiple dependent claim, if not paid
1204	86	2204	43	** Reissue independent claims over original patent
1205	18	2205	9	** Reissue claims in excess of 20 and over original patent

SUBTOTAL (2) ($) 0.00

**or number previously paid, if greater; For Reissues, see above

FEE CALCULATION (continued)

3. ADDITIONAL FEES

Large Entity Fee Code	Large Entity Fee ($)	Small Entity Fee Code	Small Entity Fee ($)	Fee Description	Fee Paid
1051	130	2051	65	Surcharge - late filing fee or oath	
1052	50	2052	25	Surcharge - late provisional filing fee or cover sheet	
1053	130	1053	130	Non-English specification	
1812	2,520	1812	2,520	For filing a request for *ex parte* reexamination	
1804	920*	1804	920*	Requesting publication of SIR prior to Examiner action	
1805	1,840*	1805	1,840*	Requesting publication of SIR after Examiner action	
1251	110	2251	55	Extension for reply within first month	
1252	420	2252	210	Extension for reply within second month	
1253	950	2253	475	Extension for reply within third month	
1254	1,480	2254	740	Extension for reply within fourth month	
1255	2,010	2255	1,005	Extension for reply within fifth month	
1401	330	2401	165	Notice of Appeal	
1402	330	2402	165	Filing brief in support of an appeal	330.00
1403	290	2403	145	Request for oral hearing	
1451	1,510	1451	1,510	Petition to institute a public use proceeding	
1452	110	2452	55	Petition to revive - unavoidable	
1453	1,330	2453	665	Petition to revive - unintentional	
1501	1,330	2501	665	Utility issue fee (or reissue)	
1502	480	2502	240	Design issue fee	
1503	640	2503	320	Plant issue fee	
1460	130	1460	130	Petitions to the Commissioner	
1807	50	1807	50	Processing fee under 37 CFR 1.17(q)	
1806	180	1806	180	Submission of Information Disclosure Stmt	
8021	40	8021	40	Recording each patent assignment per property (times number of properties)	
1809	770	2809	385	Filing a submission after final rejection (37 CFR 1.129(a))	
1810	770	2810	385	For each additional invention to be examined (37 CFR 1.129(b))	
1801	770	2801	385	Request for Continued Examination (RCE)	
1802	900	1802	900	Request for expedited examination of a design application	

Other fee (specify) _____

*Reduced by Basic Filing Fee Paid SUBTOTAL (3) ($) 330.00

SUBMITTED BY				(Complete *if applicable*)	
Name (Print/Type)	Christopher M. Beck	*Registration No. (Attorney/Agent)*	52603	*Telephone*	(703) 905-2013
Signature				*Date*	December 29, 2003

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